Journal of the Society of Arts.

FRIDAY, OCTOBER 25, 1861.

COUNCIL.

The following Institutions have been taken into Union since the last announcement:—

Godalming Institute.
Barnsbury Literary Institute.

INTERNATIONAL EXHIBITION OF 1862.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £434,700, have been attached to the Deed.

WEEKLY PROGRESS OF THE INTERNATIONAL EXHIBITION.

The domes are the only portions of the building about the completion of which in due time any reasonable anxiety might be entertained. The preparations have been carried on on the banks of the Thames, but until this last week no signs of progress (with the exception of the arrival of great quantities of iron) have been visible at South Kensington. Perhaps the fixing of this iron work might have commenced before, and the delay may be occasioned by the absence of the chairman of the Thames Iron Company, Mr. Peter Rolt, who has been abroad. Upon him, Captain Ford the manager, and Mr. Hussey, rests the responsibility of completing this work according to the contract, and it will, doubtless, be the pride of these gentlemen to execute it in a manner which shall reflect the greatest amount of credit on the company they represent.

Besides the domes a commencement has been made in fixing the ironwork of the roofs of the glass courts, and a considerable quantity of the wrought-iron girders made by the Thames Iron Company are now on the ground and ready to be hoisted.

The brickwork for the upper story of the refreshment rooms it is expected will commence next week; all the technical and legal difficulties between the Commissioners of 1851, the Commissioners of 1862, the contractors, the surveyors, and the lawyers, have been happily adjusted. These arrangements have delayed the issue of the refreshment contracts, but they will now be out in a few days.

Meanwhile the other parts of the building have been pushed forward with the same rapidity as before. The western dome-scaffold is nearly finished, and the galleries on all sides are being floored. Already one-half of the picture gallery along the Cromwell-road is glazed, and a portion of it is ready for the plasterers.

The subject of the Mosaics for the decoration of the exterior of the building, which was alluded to last week in this *Journal*, has received confirmation of its importance and practicability. Messrs. Minton have made a most successful experiment in translating a head of colossal size into small tesseræ. This is the first work of the kind which has been attempted in the Staffordshire potteries, and conclusively proves that wall mosaics may be executed in this country which will bear comparison with any similar work of antiquity. It is hoped that three mosaic pictures may be completed in time for the Exhibition. The Council of the Society of Arts has unanimously voted the sum of 100 guineas towards the funds necessary for making the experiments.

The Secretary-General of the French Commission has been in England during the past week, and still asks for more space to satisfy the wants of the French exhibitors. The quantity now allotted to France is 132,000 square feet, as against 119,000 occupied by that country in 1851, but M. Le Play is authorised by his Commission to press a claim for 45,000 more.

It is evident that Her Majesty's Commissioners with their limited resources can scarcely comply with this demand. Nearly one-third of the space apportioned to foreign countries has been assigned to French exhibitors, and although that amount may be increased by handing over to them portions which others are unable to fill, anything like the increase which they contemplate is out of the question.

It is expected that France will make a considerable display in machinery. The great firm of Messrs. Cail have demanded as much space as could be afforded to all the exhibitors of French machinery.

The following additional arrangements have been made:—

CANADA.

The following gentlemen have been appointed a Commission for the Province of Canada:—Sir William E. Logan, F.R.S., Government Geologist, *Chairman*; the Hon. L. V. Sicotte, President of the Board of Agriculture, Lower Canada; E. W. Thomson, Esq., President of the Board of Agriculture, Upper Canada; J. Beatty, jun., Esq., M.D., President of the Board of Arts and Manufactures, Upper Canada; J. C. Taché, Esq., M.D., and B. Chamberlin, Esq., Secretary to the Board of Arts and Manufactures, Lower Canada.

GUATEMALA.

John Samuel, Esq., Consul-General of Guatemala, will act as London Commissioner for that Republic.

Exhibition Traffic.

On Tuesday the representative vestry of Chelsea met to take into consideration a letter from Mr. C. Wentworth Dilke, one of the Commissioners of the Exhibition, urging the importance of widening the street from Eaton-square to Sloane-square in anticipation of the traffic which will take place next year between the Victoria station and the Exhibition buildings. Mr. Perry moved that the question be referred to the Committee of Works, and that they be called upon to appoint a sub-committee to consider the best means of carrying out the improvements suggested without delay. Mr. William Hall seconded the resolution, which was unanimously agreed to. A special committee was appointed at the last sitting of the Kensington Vestry to consider and report on the best means of widening the approaches through that parish to the Great Exhibition building, and of removing at the same time the turnpike bars now placed on these thoroughfares. They are now busily engaged in inquiring what arrangements can be made to effect these objects.

THE BRITISH COLONIES AND THE INTERNATIONAL EXHIBITION.

By P. L. Simmonds.

No. VII.—The Australian Colonies.—Tasmania.

Since the discontinuance of transportation to this island, the name of the colony has been changed from Van Diemen's Land to Tasmania. The colony is now in a very altered and improved position to what it was in 1851, the progress of population and the gold discoveries in the colonies on the main land having greatly contributed to its advancement. Its external trade has doubled in value; the local improvements have been great, and its agricultural progress steady, a better class of settlers having made it their home.

His Excellency the Governor, early in the year issued a Commission, appointing the following gentlemen to be Commissioners to make the necessary arrangements to secure the adequate representaticn of the products of the colony in the International Exhibition of 1862:—William L. Crowther, Esq., (Chairman), Morton Allport, Esq., the Hon. William Archer, M.H.A., James Boyd, Esq., Richard W. Butler, Esq., James Erskine Calder, Esq., the Hon. Thomas D. Chapman, M.H.A., Henry Cook, Esq., Mayor of Hobart Town, Henry Dowling, Esq., Mayor of Launceston, Sir Richard Dry, William Rose Falconer, Esq., the Hon. P. H. Gell, M.L.C., Charles Gould, Esq., Ronald C. Gunn, Esq., H. T. A. Murray, Esq., Circular Head; Robert Officer, Esq., M.H.A., James Scott, Esq., Launceston, J. F. Sharland, Esq., and W. Alcock Tully, Esq. George Whiting, Esq. acts as secretary in Hobart Town, and the Commission has met weekly.

No British colony recognised the value of such Exhibitions more readily than Tasmania did in 1851, when her exhibitors obtained six prize medals for her woods, two for her wheat, two for her collections of raw produce, and nineteen honourable notices for her wool and various other natural or industrial products. After such an indication of public spirit in Tasmania, it is not likely that she will fail to do herself justice in the forthcoming Exhibition, which it is believed may be made greatly to excel that of 1851 in completeness of arrangement and comprehensive utility.

The Government have agreed to advance to the Island Commissioners money to the amount of £2,000 (including £500 previously advanced) for collecting and exhibiting the products of Tasmania in Hobart Town, and recommend to Parliament a further grant of £1,000 for their transmission to and exhibition in England. The Commissioners have resolved on transmitting about £300 of the sum intended for the use of the London Committee in the shape of Tasmanian gold, which can thus be exhibited as a colonial product, and afterwards converted into cash for the purposes of the committee.

But this circumstance must be borne in mind—namely, that it is only on the principle of the division of labour, and by the voluntary individual co-operation of the most intelligent and patriotic portion of her population generally, that Tasmania can hope to maintain the honourable position she gained in 1851, or to fairly compete with her more powerful and wealthy neighbours. The Government of New South Wales has munificently placed at the disposal of the Sydney International Exhibition Commissioners the sum of £3,000, and also £5,000 for the purchase of specimens of gold—to be sold in Paris after the Exhibition—in order that that important colony may be adequately represented. This fact is mentioned in proof that if Tasmania be expected to hold her own in the race of generous emulation on which she is entering, it can only be done by the most energetic and strenuous exertions.

The progress of every country must depend almost wholly on its physical and industrial resources—as the commercial and manufacturing supremacy of Great Britain is mainly attributable (next to the energy and enterprise of the Anglo-Saxon race) to the practical contiguity of her coal, her iron ore, and her limestone. It is little more than two centuries ago that all the iron produced in England was smelted by wood charcoal, in the woodland districts, just as large quantities of iron are now smelted in the United States, and as iron may possibly be smelted profitably even in Tasmania. England attained a knowledge of her most economical processes by slow degrees, having no International Exhibitions to instruct her. Tasmania cannot, at present, boast of being a gold-producing country to any great extent, but geological analogies have too much weight in the present day to permit it to be doubted that a country so nearly identical in geological structure with the colonies which produce the precious metals, and also copper and lead so abundantly, must itself contain some valuable but undiscovered mineralogical resources, which may be developed by industrious research. It is only by having numerous observant eyes and reflective minds engaged in searching for them, however, that these mineralogical treasures can be discovered, and no project more suitable than a public Exhibition can be devised for stimulating and rendering such individual explorations effective.

The Commissioners proposed to hold an Exhibition in Hobart Town on the 1st of October, and to give prizes for the best articles exhibited, and invited their fellow colonists to assist them, by contributing specimens of every mineral which can serve to elucidate and develop her resources. Such specimens were to be described as "occasional" or as "abundant" in their respective localities, to prevent false inferences as to their indicational value: and all products sent with the distinct understanding that they are to be transmitted to England or not, at the discretion of the Commissioners.

New discoveries are constantly taking place in every country, in which some product previously unknown is found to possess commercial value. The discoveries of phosphate of lime, so much in demand for English agriculture, in the coprolites of the Suffolk Crag, at Estramadura, in Spain, and in many parts of America, may be taken as an instance of the importance of intelligent exploration. It is believed that this substance abounds in the guano on the islands around the coast.

The great forte of Tasmania is in her woods, for which, in 1851, she gained six prize medals and five honourable notices. It is felt, however that her more durable timber was scarcely done justice to in 1851. Since the failure in the adequate supply of English oak, hard woods, such as those of Tasmania, are so much in request for railway and shipbuilding purposes, that iron has in many cases been systematically substituted for them.

It is intended to exhibit, in 1862, large specimens of knees and other portions of Tasmanian ship timbers, which have been found to be so durable, and unsusceptible of injury from dry-rot. Any well-authenticated instances of the durability of Tasmanian timber, as furnished by old piles, posts, &c., which have been for many years exposed to at-

mospheric influences, will be most useful in proving and illustrating this its most valuable quality.

The ornamental woods of this colony excited great notice in 1851, as admirably suited for cabinet work. Some of the best woods are to be sent home and made up in the most finished style, to be exhibited as manufactured specimens.

The Commissioners state:—"It is proposed to make our timber the main feature of the Tasmanian Exhibition. We intend to illustrate not only our marketable hard timber of all sorts as now sold here; but also to send home some very large specimens of ship timber in knees, planks, &c., such as perhaps no other country can furnish of equal quality and in similar abundance. Timber suitable for railway sleepers, telegraph posts, &c., will not be forgotten, whilst our beautiful fancy woods will be illustrated, not only in made-up specimens of cabinet work, but also in polished slabs, and in the rough, the stem wood, as well as the root wood. To illustrate the size of our timber, a very large section of a tree will be sent hooped, including the bark. A plank of great length will also be procured from Port Arthur. Application has also been made to Her Majesty's Commissioners, for space in the main avenue for a Tasmanian Timber Trophy, similar to that exhibited by Canada in 1851, to occupy a space of twenty feet square. We shall endeavour to construct this trophy here in as picturesque a form as the materials will admit of. The magnitude of its dimensions will render it a striking object, and if embellished by an admixture of our fancy woods, it may perhaps even be rendered an attractive one. Amongst our large objects will be two pairs of the jaws of the whale, which may possibly be shown to advantage, either in the Timber Trophy or in connection with our show of oils. In reference to our timber, we may here mention that Mr. Boyd, most energetically, will prepare an herbarium illustrative of our timber trees, of which Mr. Morton Allport has also undertaken to supply stereoscopic views."

Our shipments of timber in the shape of railway sleepers, &c., still continue as opportunities of sending it home as dead weight offer. Some discussion has arisen as to the possibility of sending it into market at a less price than was estimated in former calculations, and hopes are entertained that henceforth European engineers and contractors who may be disposed to make use of our hard woods, will be able to realise the condition of cheapness as well as the superiority of material. Much will be done to throw light upon the extent to which this colony is in a position to meet the requirements of the great manufacturing and engineering interests of the world, by the illustrations forwarded from Tasmania to the Industrial Exhibition of 1862.

It is believed that the samples of wheat, flour, and wool will fully equal in quality those which in the Exhibition of 1851 obtained prizes and honourable mention, and furnish satisfactory evidence of the still exuberant fertility of our soil.

The wheat exhibited by Tasmania in 1851 was specially noticed by the jurors as being the finest from any part of the world, excepting only that from South Australia. The flour was also highly eulogised—as were biscuits manufactured from it. It is confidently assumed that the agricultural interests of Tasmania will not be allowed to lose the 'vantage ground thus gained.

Experiments are being made on the bark of the stringybark, gum, peppermint, silver wattle, &c., in order to ascertain their relative value as material for cordage, mill-board, paper, &c. The fibres of flax, native flax, and other herbaceous plants will also be represented. The experiments on the production of a paper-fibre have been attended with some recent results of a very satisfactory character, and some beautiful samples of bleached fibre will be exhibited.

One of the Commissioners, Dr. Officer, is engaged in distilling oils from the leaves of the gum tree, and of other Tasmanian trees, which may be supposed to possess remarkable medicinal properties. A confident hope is also expressed that a good specimen of paraffine oil will be forwarded. Of this there can be no doubt. The oil has been produced in the colony in the purest form, and has answered the purpose of illuminating houses, theatres, concerts, &c., with brilliant effect. The proper hope to be expressed is that the bed of shale or dysodyle, which furnished the material from which the paraffine oil was distilled, will prove sufficiently extensive to furnish the basis of a large and profitable enterprise.

This colony has long been famous throughout Australia for the production of magnificent specimens of nearly all the fruits and vegetables of Europe which have been acclimatized here. The export of fruit constitutes one of the leading branches of our summer trade. Nor is it likely to decline, as some have supposed, in consequence of the extension of orchards in the other colonies—especially in Victoria, where large tracts of land are being brought under garden culture. The extreme changes of the season and temperature to which the colonies on the main are subject, and the destructive effects of a hot wind on all vegetation, and especially on growing fruit, will always render the prospects of a crop in the highest degree precarious. Besides which this greater heat forces the fruit and ripens it at a much earlier date than in Tasmania, so that the garden produce of Victoria would be exhausted before the colony would be ready to pour its supply into the market. We have every reason to look forward therefore to fruit and vegetables as constituting one of the chief exports of Tasmania. The illustrations of its fruit-growing capabilities, which will be seen in the Exhibition, will serve two purposes. In the first place they will show the gardener what a field there is afforded him for his enterprise. In the second place, they will prove how much the colony has to offer to the immigrant of the luxuries of the old land. Under the head of Tasmanian Fruits the Commissioners say:—"Most of the finest prize specimens exhibited at our last Horticultural Show will be represented, in coloured photographs or in wax models, together with as perfect a list of the various sorts of fruit grown in Tasmania as the secretary can procure."

The wool of Tasmania, the principal staple export—which was honourably noticed in 1851, and in the getting up of which great improvement has been made within the last ten years—will, it is confidently anticipated, be fairly represented by the "clip" of the coming season, especially as to fineness of fibre, combined with length of staple.

The whaling interest, which has recently received a new impetus, will probably supply very superior specimens of the different varieties of oil, head-matter, whalebone, &c.

The manufactured articles shown will probably be few in number, but it is intended to send a supply of the best fancy woods to be made up into cabinet work, and a quantity of the best skins to be converted into railway rugs, &c., by London furriers. The fancy woods will probably thus be seen to advantage, even in comparison with the best furniture of all countries. It is to be hoped that before the time for completing the collection of specimens has arrived, the Commissioners will find themselves in a position to do much greater things than they have thus modestly promised. The local journals add,—"We have all the ordinary domestic manufactures established amongst us, and have it as much within our power to forward, for instance, specimens of colonial boots made of colonial skins, as Paris to forward its contributions of patent leather and kid. Our manufactures embrace a wide range, and it is of the highest importance that this department should be made, in a complete sense, illustrative of the state of the industrial arts in Tasmania."

It is feared that the colony will scarcely be able to furnish any considerable collection of gems, unless perhaps Dr. Milligan may be able to do so, from the ample store which that gentleman collected whilst a resident in the colony.

The principal specimens of minerals forwarded for ex-

hibition will probably consist of coal and dysodyle or bituminous shale. Mr. Gould, whose reports on the coal-beds of the colony have re-awakened public interest in this branch of enterprise, will furnish specimens of each coal-field, showing the actual thickness of the seam.

Iron-sand and iron-ores, with gold, are, however, among Tasmanian products; whilst granites, marbles, and limestones are abundant.

This colony, possessing only a population of ninety thousand souls, and raising a revenue of three hundred and fifty thousand a-year, has in the Derwent, on which its capital is built, one of the most magnificent harbours in the world—one ranking with Cork, with Rio Janeiro, and with Port Jackson; a climate temperate, salubrious, and delicious, which is sought for its invigorating qualities by the parched denizens of the colonies beyond the Straits; a soil capable in its virgin richness of yielding an increase to the agriculturist that to an English farmer would sound fabulous; vast deposits of fertilising manures on its isles and islets; facilities, created by nature herself, for the artificial irrigation of great tracts of country, on whose hill-tops are suspended chains of lakes; water-power capable of being used for manufacturing processes, and exhaustless forests of timber, beds of coal, and other valuable minerals. These rich endowments indicate to the thoughtful mind the future of Tasmania, as the seat of a busy industry, and the great source of supply to the markets of Australia.

Tasmania has yet a great part to play as one of the industrial centres of Australasia. It will be her destiny, when the mutual relations between the several colonies, natural to the endowments of each, become developed, to supply the teeming population of Australia with a large proportion of the manufactured goods they consume. Unquestionably this colony will become the seat of a great productive industry. The activity of her workshops, her looms, her factories, will afford rich compensation for the want of gold-fields. That day of manufacturing prosperity will not come upon the colony suddenly. We may recognise already its faint early dawn. It depends entirely on themselves to speed the advent of its noon. Gradually, if alive to their responsibilities, they may force their manufactured wares into the colonial market. It is in this light we see the importance of promoting amongst the rising population an industrial art education.

The colonists would doubtless have attended to these matters—which, indeed, constitute the true work of Tasmania—before, but for the intervention of causes that have distracted their attention from the special duty which Providence has assigned them in the Australian system. Looking with envious eyes upon the great strides made by Victoria and New South Wales—the former colony especially—consequent on the discovery of the gold fields, they endeavoured to discover within their own borders auriferous deposits, not sufficiently mindful of the fact that the timber that clothes their hills, the coal that lies buried beneath their soil, the raw material they possess in abundance for various manufactures, their genial climate, their fertile soil, their rivers and mountain streams, available the one for motive power, the other for carriage, were the real gold fields of Tasmania.

A space of 650 superficial feet has been accorded to the colony, which is sure to be well filled, for in the island papers just received I notice the following statement made:—"We heartily congratulate the Commissioners appointed to secure the adequate representation of the interests of the colony in the coming Great Exhibition of 1862, on the success which we learn has attended their labours up to the present time, in obtaining specimens of our natural and industrial products. We are aware that—as we believe is usual in almost all initiative proceedings of a kindred nature—some considerable apathy was in the first instance manifested by the residents both of the towns and the country districts of the colony. We have at length the gratification of perceiving that a growing interest in the labours of the Commissioners is becoming manifest, and we now doubt not, that on the assembling of the various representatives of other climes within the great metropolis the various products of our colony will command that attention which they undoubtedly deserve."

The Commissioners in London representing this colony consist of the following gentlemen:—F. A. Ducroz, Esq., Dr. Joseph Milligan, F.G.S., and James Youl, Esq., men who have rendered important services to the colony. Dr. Milligan was for some years secretary to the Royal Society of Tasmania, and, it will be remembered, read a most interesting paper before the members of the Society of Arts last session, for which he was awarded a silver medal by the Council.

INTERNATIONAL EXHIBITION OF 1862.

SANITARY APPLIANCES.

The following paper has been received from Mr. Edwin Chadwick, C.B., who, in a letter to the Secretary of the Society of Arts, says:—

"The following programme was drawn up by me for the Committee on Sanitary Appliances for the International Exhibition of 1862. A wish having been expressed that I should make it public, I submit it to you, although it is incomplete, with the view of suggesting to Foreign as well as British Manufacturers, the rank and importance of classes of articles of their production as means for improving the health and comfort of populations. Some of the articles referred to have had their chief development in this country since the Exhibition of 1851.

"Richmond, Surrey, S.W."

1.—Since the last Exposition, the use of tubular house drains and sewers has been developed. It is known that upwards of eleven thousand miles of such drain-pipes have been manufactured. There are great varieties of material—vitreous pipes; red ware pipes; socket-jointed pipes; rabbet-jointed. They are now exported to America and to Australia. Accuracy of form and jointing are qualities of special importance for this description of articles. On the trial of some to which increased accuracy was given by mechanical pressure, after the clay had been partially dried, about one-fourth more rapid discharge and power of sweep for self-cleansing, was found to be given to pipes of the same diameters and inclinations, and with the same quantities of water.

Since the last Exposition new forms of apparatus, valves, and traps, to prevent the ingress of foul air into houses, have been introduced in great variety. The manufacture of soil-pans and water-closet apparatus is largely increasing with the abolition of cesspools in towns; and the production of this species of apparatus was lately known to be proceeding at the rate of upwards of a thousand a day. A great improvement in the health of the population, almost house to house as they have been introduced, and communication from sewers of deposit prevented. The qualities sought for in the construction of this apparatus are:—1st. A complete sewer for the removal of the soil. 2nd. The best trap against the ingress or regurgitation of effluvia from the general system of town drainage and sewerage with which each soil-pan and house-sink must communicate. 3rd. The consumption of the least quantity of water for a complete sewer and perfect trap. 4th. Durability, *i.e.* freedom from liability of breakage in consequence of frost, from derangement of the machinery, from breakage by careless usage, from stoppages. 5th. Easy repair. 6th. Cheapness when manufactured on a large scale. In some of these apparatus, complete removal is effected by half a gallon of water, in others two gallons of water or more is used. Attention has not hitherto been paid to the importance of effecting the cleansing purposes with the least quantity of water, with a view to the avoidance of the unnecessary bulk of sew-

age, and to excessive unnecessary dilution, for the application of the sewage to agricultural production. This description of apparatus would form an important subject of interest to officers of public works, Foreign as well as British, and to colonists and foreign architects who are beginning to follow the example of England in sanitary matters.

2.—The manufacture of pipes and apparatus for the collection and distribution of water into towns and houses may display considerable advances. For the spring collection of water, the permeable agricultural pipe drains have been of late much used in England. For water leading, earthenware pipes have come into use very beneficially, but of small diameters, and very low pressures, seldom exceeding thirty or forty feet, but not at all for the interior of towns and houses, although from Roman and Greek remains, and the instructions of Vitruvius, they were anciently used successfully for house as well as town supplies, under a hundred feet of pressure and more, by contrivances for the avoidance of fracture by hydraulic jerks. In France water has been distributed under pressures of upwards of one hundred and sixty feet. In several parts of the Continent, vitreous earthenware as well as glass has been used for the distribution of gas as well as water. Besides the greater economy of the material, it has for the distribution of water the advantages of greater purity than metal, which oxidises. The complete collection of these appliances would be very interesting. It is now found that lead piping has on some waters a more extensive and injurious effect than has hitherto been apprehended. To obviate this in pipes for house distribution, an interior lining of non-metallic enamel has been applied. Enamels composed chiefly of coal tar, as well as of vitreous materials, have been applied extensively to wrought as well as to the largest cast-iron trunk mains. With the increasing demands for the introduction of water into cities and houses, and manufacturies, new demands have arisen for improved water meters. Of the whole quantity of water pumped into London, nearly three-fifths was found to be pumped in waste. In other towns the waste of water is often in as great proportion. Since it is proved to be necessary, on sanitary grounds, to discountenance the storage of water in houses in crowded districts, where it absorbs foul gases, and to deliver water direct, the prevention of waste has become a matter of great importance, and hence a great variety of taps and self-closing apparatus and contrivances for the purpose.

Up to the year 1854 the General Board of Health had sanctioned, or prepared sanctions, to an expenditure of about six millions of money by Local Boards of Health for the sanitary improvements of towns. One part of the expenditure was for earthwork, the remainder was chiefly for new apparatus of a description which would come under the two above-recited heads. Since that time probably an equal amount of expenditure has been incurred on the like appliances in the British towns alone.

3.—About the time of the last Exposition the estimated washing bill for the metropolis was five millions sterling per annum, and it was probably under-estimated at that amount. By a general smoke consumption, if only to the extent to which smoke consumption has been effected in particular instances, the fouling of clothes and the expense of washing might be reduced one-half. Five-sixths of the heat from the combustion of coal, or some such proportion, escapes unapplied in the common chimneys. Since the last Exposition more attention has been directed to the subject, and there have been new grates and kitchen-ranges invented with the pretensions of consuming smoke or economising heat. A portion of the English fire-grates have been examined by a commission on warming and ventilation, which made a report about two years ago. Since then other inventions have been brought forward in England. A portion of the English kitchen ranges have been examined by a commission on barracks and hospitals. These partial trials have had, however, by no means the public or professional attention which is due to them. Some of the grates pretend to save two-thirds of the fuel, and there is little doubt several save half. But on the Continent, particularly in France, where fuel is very dear, the exertions to economise it appear to have been far greater. In America, also, considerable advances in this species of appliance have been made. It is reported that the French cooking ranges are worked with half the fuel of the most approved, and with a quarter the quantity of fuel consumed by the common kitchen ranges in England; and that cottagers' grates in France are made to suffice with one-third the fuel used here. In Paris the warming of some large public edifices appeared to be less expensive than in Manchester, where coal is little more than a quarter the price. It is stated that in Austria, in Vienna in particular, open fire places are in use, lined with a cleanly and very ornamental earthenware, which are of very great warming power. It is also stated that very superior and very ornamental apparatus of this description is in use in Sweden. Tuscany has terra cotta, or red ware clay fire-places, which are works of art.

It would be one of the greatest practical achievements of the Exhibition if the opportunity were taken to obtain a complete collection of all the best apparatus of this species, foreign as well as British, and to have their warming or cooking powers tried, and the results reported. With this view, it is proposed that a room or rooms should be prepared for the purpose, and inventors be invited to send their apparatus for trial, and competent persons should be appointed to conduct the trials. They should be conducted as competitive examinations, and the results made public. The proceeding might be expected to be one of great interest, and it might be commenced long before the opening of the Exposition, when the apparatus tested might be exhibited.

The Commissioners of those countries where fuel is the most scarce, and which have the greatest interest in the subject, should have their attention specially directed to it, and they may be expected to give active aid upon it. The French Commissioners, as also the Austrian, may be requested to have preliminary trials made, and to bring over their best, with an account, to be re-tested, of their power of warming, with a given quantity of fuel, a given space; or in cookery, of cooking rations with given quantities of fuel. The variations of the English ranges exhibited in the report of the Commission for the sanitary improvement of barracks and hospitals, was from 64 ounces to $2\frac{3}{8}$ ounces daily of coal per head of men cooked for.

At Paris, an apparatus in the form of a worm, kept filled with water, and placed in a chimney, was reported to catch two-thirds of the heat commonly wasted, and in the hot water, to convey it to parts of buildings distant from the chimney, for the purpose of heating them. In other ways the chimney heat, so extensively wasted in England, has been utilised of late by French architects.

By directing attention to points of selection, giving its place to none without fair specified pretention to distinction, either in improved construction, or quality, or reduced price, space may be saved and the objects of the Exposition promoted.

4.—The preceding observations are applicable to apparatus for ventilation, in which there has been at all events an increase of attention since the last Exposition. At Paris there have been some important trials; and reports on competitions between methods of hospital ventilation, applicable to other buildings, if not to private houses, have been made. A hot-water tank at the top of a building, through which pass the ends of flues for the removal of vitiated air, is reported to be a very cheap and easy working power for the constant change of air.

5.—Two great evils in house construction are (1) damp in walls, which, by evaporation, lowers temperature, and produces one class of diseases; and (2) absorbence of the mephitic gases. A common English brick absorbs almost a pint of water. A newly constructed house requires several months to dry. A row of new houses when first inhabited, are sure to be productive of a crop of illnesses.

Those who visit the lower class of houses, in which dead bodies have been retained, are aware how long the dead man's smell remains in walls. Miss Nightingale makes it a great point to obtain non-absorbent walls and wall surfaces, as well as floors for hospitals. It would be of great importance to ascertain what progress has been made in this matter since the last Exposition by improved hollow brick. The degrees of absorbence of various materials, or of combinations of materials, might be advantageously tested, and the results noted on the materials.

For all the earthenware materials, whether drain tiles, house and town drains, hollow pot bricks and tiles, plans and models of kilns of an improved construction, which consume the least amount of coal, and which are of easy construction, for rural districts and for the colonies, are of great interest and importance for sanitary works; also, improved tile, pot, and brick-making machines.

The objects of this portion of the Exhibition may then be thus classified for the attention of Foreign as well as of British exhibitors:—

1.—THE APPLIANCES FOR WHICH THE DRAINAGE OF HOUSES AND THE SITES OF HABITATIONS AND TOWNS, AND THE REMOVAL OF REFUSE MATTERS ARE EFFECTED; AS:—

House drains, and the machinery for their construction.
Water-closets, and the machinery connected with them.
Earthenware pipes, sewers, and gully-shoots.
Traps for preventing the escape of effluvia from sewers and house-drains.
Urinals of earthenware and iron.

2.—THE APPLIANCES FOR THE DISTRIBUTION OF WATER INTO TOWNS AND HOUSES:—

Iron mains, with the new glazes and means for the protection of the metal from the action of water, or of water from the action of water.
Earthenware pipes for collecting and leading water into towns, and distributing it.
Pipes of iron, tin, or lead, or other metal, for the distribution of water into houses, with the means of protecting the water from the action of the metals.
Earthenware pipes which have been used for the same purpose in Switzerland, France, and Germany.
Taps or cocks, and valves used for the distribution constant supplies of water into houses of high-pressure; self-closing taps for the prevention of the waste of water.
Water-meters, for regulating the sale of water.
Apparatus for the purification of water; filterers of earthenware or of glass; sand and charcoal filters.
Bath apparatus; public and private shower-bath.

3.—APPARATUS FOR WARMING HOUSES; AND FOR COOKING AND CLOTHES WASHING.

Fire grates for cottages and for houses of various grades, with their warming power with given quantities of coal noted.
Smoke consuming kitchen ranges of various species.
Kitchen boilers and domestic washing apparatus.
Apparatus for warming houses by the distribution of hot water.
Stoves for warming houses, by descending flues conducting hot air through hollow floors and walls.
Chimney flues of earthenware pipe flues, as well as iron, ornamental as well as plain.
Appliances for *cooling* houses and dwelling rooms in very hot weather.
Refrigeratory apparatus.

4.—APPARATUS FOR VENTILATING HOUSES AND BUILDINGS.

Syphon ventilators.
Chimney valves.
Window valves.
Air pumps, on a large and a small scale.
Blowers or pumps for driving in pure air. Pumps for extracting vitiated air.
Anemometers for regulating the removal of air.

5. APPARATUS OR MATERIALS FOR THE PREVENTION OF DAMP AND COLD IN HOUSES.

Walls, floors, and roofs—hollow and non-absorbent bricks, pots, and tiles for their construction.
Glazed pottery and non-absorbent surfaces for walls.
Apparatus for the prevention of the escape of heat, or for protection from cold through windows.
Double windows.
Thick window glass for cottages.

6.—APPARATUS FOR THE SERVICE OF THE SICK IN HOUSES; AND HOSPITALS FOR THE REMOVAL OF THE SICK.

An exhibition of special cottage furniture and appliances.
Huts, tents, and model cottages of various material, with furniture for emigrants or new settlers, or navvies.

BISHOP WATSON AND THE ELECTRIC TELEGRAPH.

BY DR. HAMEL, OF ST. PETERSBURG.

At the Telegraph *Soirée*, which took place in September last at the Free Trade Hall at Manchester, during the meeting of the British Association for the Advancement of Science, Mr. W. R. Grove, F.R.S., well-known as the inventor of one of the forms of a voltaic battery, addressed the numerous assembly, and gave a sketch of the history of the rise and progress of the electric telegraph.

He began by repeating the statement made by some authors, that Bishop Watson had given the first idea of an electric telegraph.

Now, as the said Bishop never in the least occupied himself with electric telegraphy, I think it right to explain so great an error, especially as I have already, some years ago, given an account of the incorrectness of such statement to the Imperial Academy of Sciences at St. Petersburg.

In 1744, Dr. Ludolf, at Berlin, had found that, by the electric spark, sulphuric ether could be ignited; and soon after Professor Winkler, at Leipzig, succeeded in also kindling alcohol, and even common proof spirits.

These experiments excited at the time no small surprise. An account of them, translated from Winkler's description, was, in November of the same year, communicated to the Royal Society in London.

Mr. William Watson, an apothecary, having a shop in Aldersgate-street, who had been since 1741 a Fellow of the Society, undertook to repeat what had been done at Berlin and Leipzig.

He constructed for the purpose a rather rude electrical machine, with glass globes or tubes, to be rubbed against leather cushions, the conductor being sometimes a common poker, sometimes a gun-barrel, suspended by silk cords.

In March, 1745, he was able to announce to the Royal Society that he had succeeded in igniting ether and alcohol by sparks drawn from his poker, and the Society voted him, before the end of the year, the Copleyan Medal.

In October of the same year, the Dean of the "Domcapitel," at Kamin, in Pomerania, Prelat Kleist—whom Dr. Lardner erroneously calls a monk at Leyden—had found that the electricity from a conductor could be collected in a glass containing some water, into which a nail had been placed upright; and in the year following (1746) it became known that Musschenbroek—quite independently of Kleist's prior discovery—had made flasks for the accumulation of the electric fluid. A wire went through

the cork to the water in a bottle. As this had taken place at Leyden, flasks for the accumulation of electricity have since, not justly, been called by the name of that town —Leyden jars.

Hardly had Kleist's and Musschenbroek's bottles become known, when Professor Winkler, at Leipzig, tried to discharge them through a certain distance of water, which he did in the river Pleisse, in Reichel's (then Appel's) garden. Dr. Le Monnier, at Paris, did the same at greater distances through the water of the basin in the garden of the Tuileries.

The apothecary Watson, in London, who had, as we have seen, got a machine made to repeat the ignition of inflammable fluids by sparks from the conductor, undertook, in 1747, to repeat also the said experiments made on the Continent, to discharge Leyden flasks through water.

He discharged bottles containing, instead of water, iron filings, and being, by the advice of the astronomer, Dr. Bevis (who was Secretary to the Royal Society), externally covered with a thin sheeting of lead, first in London, through the river Thames, near Westminster-bridge, over which, to complete the circuit, a wire was laid, and subsequently out of London, in the so-called New River, near Stoke Newington, through much greater distances of water. He also discharged, near Shooter's-hill, Dr. Bevis's jars through nearly two miles of wire, suspended on wooden sticks, the current having to return to the outer covering of the jar through the soil.

So William Watson has proved that the electric current from a Leyden jar will travel through considerable distances of water as well as earth, and along wires suspended in the air on sticks. But he never had an idea of applying his experiments to telegraphic purposes.

He wrote in 1746, after having communicated to the Royal Society the results of his first (igniting) experiments: "If it should be asked, to what useful purposes the effects of electricity can be applied, it may be answered, that we are not yet so far advanced in these discoveries as to render them conducive to the service of mankind." He adds, "Future philosophers may deduce from electrical experiments uses extremely beneficial to society in general." Nor did Watson, when in the year following he made the discharging current of electricity from a Leyden jar pass through certain distances of water, wire, and earth, entertain the slightest idea of applying this to telegraphic purposes. But, notwithstanding that, it has been lately stated in print, "Dr. Watson, of England, was the first to propose the construction of an electric telegraph, in 1747."

William Watson's favourite study had always been botany; through it he had gained the esteem of Sir Hans Sloane.

I have, in my "Tradescant," mentioned that Watson, in 1749, visited, with Dr. Mitchel, the locality in South Lambeth, where Tradescant, the father, in the beginning of the seventeenth century, had established his well-known garden. He rejoiced to find some exotic plants still there, that had been introduced by the said Tradescant.

In 1754, Watson was charged by the Royal Society to communicate to Dr. Lining in America, who had occupied himself with experiments of conducting lightning from the clouds, some details about Professor Richman's melancholy fate at St. Petersburg. This martyr to science was, as is well known, in 1753, killed by a flash of lightning whilst looking at the index of the apparatus for observing the atmospheric electricity, which was connected with a conductor placed on the roof of his house.

We see here that William Watson also paid attention to the drawing of sparks from the clouds, as he had done previously from the poker of his electrical machine, but he ignored the existence of a sort of telegraphic apparatus, working by frictional electricity, which had been made at Renfrew in Scotland, in the very year in which Richman at St. Petersburg was killed by a flash of lightning.

In 1757, Watson received from the German Universities of Halle and of Wittemberg, diplomas as Doctor. Hence he is, in describing his previous electrical experiments, sometimes called Doctor, though at that time he had not that degree. In 1759, he began—rather late—to apply himself to the study of medicine, and, in 1760, he was appointed Physician to the Foundling Hospital in London. A year before his death, which took place in 1787, King George III., before whom, as young Prince of Wales, he had experimented with his electrical machine, conferred on him the order of Knighthood, on the occasion of a congratulatory deputation. So he died as Sir William Watson.

The Christian name of that Watson, who in 1816 died as Bishop of Landaff (in South Wales, not, as has been printed at Paris, in Ireland), was Richard. He was born in 1737, at Heversham, near Kendal, in Westmoreland.

In 1745—1747, when the apothecary, William Watson, was making his electrical experiments in and near London, Richard was, at the place of his birth, a boy frequenting the grammar school, of which his father had been nearly forty years head-master.

Having lost his father in 1753, he was in the following year sent to Trinity College, Cambridge, of which he was elected a Fellow in 1760. He took the degree of Master of Arts in 1762.

In November, 1764, he was elected Professor of Chemistry. He has described this in the following words:— "At the death of Dr. Hadley I was unanimously elected by the Senate, assembled in full congregation, Professor of Chemistry. An eminent physician of London had expressed a wish to succeed Dr. Hadley, but on my signifying to him that it was my intention to read chemical lectures in the University, he declined the contest. At the time this honour was conferred upon me I knew nothing at all of chemistry, had never read a syllable on the subject, nor seen a single experiment in it."

By great application, Watson was enabled, after about fourteen months, to begin his lectures. Subsequently he wrote several papers, and his "Chemical Essays," in five small volumes, have been more than once reprinted. In 1769 he was made a Fellow of the Royal Society.

In 1771 he was, on the death of Dr. Rutherforth, elected to the office of Regius Professor of Divinity, although by his own account he seems to have been hardly better prepared for the chair of Divinity than he was for that of Chemistry seven years before.

In 1782, he was promoted to the Bishopric of Landaff.

Without mentioning his numerous religious and other publications, nor the sinecures and other very lucrative situations given to him, I conclude by stating that, although the brilliant discoveries of Galvani, Volta and Davy were made in his time, and although he survived Soemmerring's invention of the galvano-chemical telegraph by seven years, and Baron Schilling's exploding powder mines by galvanic electricity across the river Neva by four years, he never in the least attended to electricity and electric telegraphy. In his writings the word Electricity does not occur a single time. Notwithstanding this, however, he has just been held out to the British Association for the advancement of Science, as the person who gave the first idea of an electric telegraph.

Let us hope that a similar assertion will never again be repeated. Bishop Watson's name has no right to appear in the history of the electric telegraph.

THE SANITARY CONDITION OF THE CITY.

On Tuesday, 22nd inst., Dr. Letheby, the Medical Officer of Health, presented his report to the Commissioners of Sewers on the sanitary state of the City of London, for the summer quarter of the present year, ending the 28th of September. Of this document the material portions are subjoined:—

"The number of births registered in the city during the quarter is 839, and of deaths 640. Both of these present a marked improvement in comparison with the

average of the last six years; for the former has advanced from 820 to 839 in the quarter, and the latter has declined from 683 to 640. The chief increase in the proportion of births has been in the Western district, where the number has been raised from an average of 186 to 218. In the three districts of the City the annual birth-rate has been 29·6 per 1,000 of the entire population. In all England the annual birth-rate for the summer quarter is 32·8 per 1,000. Of the 640 deaths in the quarter 264 occurred in the Eastern Union, 163 in the Western, and 213 in the Central or City Union. These numbers are in the annual proportion of 25·9 per 1,000 of the inhabitants of the first-named district, 24·0 per 1,000 of the second, and 18·7 of the third, the death-rate of the whole city being 22·5 per 1,000. In all England the death-rate in the summer quarter is 20·4 per 1,000, and in the districts of the chief towns of England it is 23·8. While, therefore, the average proportion of deaths in the whole of the city has not been unusually large, that of the Eastern division of it has been excessively so; and in the Cripplegate sub-division it has amounted to 29·8 per 1,000 of the inhabitants. The density of the population in this district is enormous; it amounts to 290 persons upon an acre; whereas in the whole of the city there are but 156 persons to an acre, and in all London but 36. This accounts for the excessive mortality of the Eastern division of the City, and shows, in connexion with the poverty of the district, the difficulties which have to be surmounted in improving its sanitary condition. Of every 100 deaths 45 have occurred among children of less than five years of age; nine among young persons at from 5 to 20 years of age; 10 at from 20 to 40; 16 at from 40 to 60; and 20 at 60 and upwards. The mortality among infants is rather large, for in the rest of England it is only about 41 per cent. of the total deaths. Contrasted with the averages of the last six years, there has been a falling off in the proportion of deaths from several important diseases, as continued fever, scarlet fever, smallpox, and measles. These have declined from a total average of 81 in the quarter to 39. Continued fever has fallen from 29 to 18, scarlet fever from 25 to 18, smallpox from 10 to 1, and measles from 17 to 2. Some other forms of disease, however, have advanced; thus, whooping-cough, croup and diphtheria have been increased from 28 to 43, and inflammatory affections of the lungs from 54 to 63. Altogether the number of deaths from zymotic affections has been reduced from an average of 179 in the quarter to 155, while that from tubercular diseases has increased from 154 to 163. Diphtheria and croup have been rather severe, but there have been no specialities in the origin and development of these diseases to lead to any conclusion in respect of the laws of their progress or the means for their abatement. The laws which govern these manifestations of disease have yet to be discovered, and this is one of the aims of sanitary investigation. At present we merely recognise the fact that these maladies are affected by local circumstances, and are, as it were, intensified by filth and overcrowding, and such like unwholesome agencies; but we have yet to ascertain what are the real influences concerned in their propagation, as well as the particular agencies which originate them and determine their speciality. The meteorology has been deduced, as usual, from the observations at Guildhall, under the superintendance of Mr. Haywood. The mean temperature of the quarter has been 60 deg., which is the exact mean of the corresponding period of the last 43 years. The highest point which the thermometer reached was 85 deg., and the lowest 45·8 deg. The former was attained on the 12th of August, when at Greenwich the thermometer stood at 89·3 deg.; and the latter was on the 27th September, when at Greenwich it was 37·7 deg. These, as well as other observations, show that the temperature in the City is more uniform than it is at Greenwich. The greatest daily range of temperature has been 23·4 deg., and the average of the ranges 19·3 deg. The diminished rainfall has influenced the condition of the river; for the proportion of solid matter has risen from an average of 33·8 grains per gallon (that of the preceding quarter) to 128·7 grains; of this nearly 9 grains were organic matter, and 93 were sea-salt. The condition of the water has been rather offensive, and it has shown a tendency to active decomposition, nothwithstanding that the temperature of it has not exceeded 67·5 deg. In the autumn quarter of 1859 there was nearly the same state of the water, as regards its appearance, its odour, and its chemical composition. At that time the rainfall amounted to only 5·5 inches, and the temperature to 71·3—conditions which are very nearly similar to those of the past quarter.

"Touching the sanitary work of the quarter, 1,404 houses have been inspected and 852 visits made to the common lodging-houses of the city. These have resulted in the issuing of 596 orders for sanitary improvement. Of the visits of inspection 511 were made in consequence of the existence of diarrhœa among the inmates of the houses, and 46 because of fever. The markets and slaughter-houses have also been duly inspected, and the officers have seized 21,706 lb., or about 9½ tons of meat as unfit for human food. 17,958 lb. were seized in Newgate-market, 1,543 lb. in Leadenhall, and 2,105 lb. in Aldgate. Of these, 5,439 lb. were putrid, 10,827 lb. were diseased, and 5,440 lb. were from animals that had died from natural causes. The seizures consisted of 98 sheep, 35 pigs, 1 calf, 150 quarters of beef, and 130 joints; besides which there were seized in Leadenhall-market, on account of putridity and death from natural causes, 184 fowls, 67 rabbits, 256 ducks, 102 pigeons, 17 hares, and 18 haunches and quarters of venison. All of it was sent to the boilers and destroyed as food. The water from 12 of the city pumps has been analysed during the quarter, and the results, as in the former cases, show an enormous amount of saline and organic impurity. Altogether there have been 34 of the city pumps examined, and in every case the water has been fouled by surface drainage. There is not one of these pumps that derives its supply from the deep strata of the London basin; and, excepting the pump in Glover's-hall-court and that in Guildhall buildings, none of them furnish water that is fit for domestic purposes. At the best of times some of them yield water which contains from 100 to 130 grains of saline and organic matter in the gallon, and all of them are excessively hard from the altered products of decomposition. The knowledge of the composition of the soil through which the water passes should warn us of the danger that may at any moment arise from its use. It may be that it has often been drunk with impunity, and that it has rarely shown any immediate manifestation of its morbific action; but it cannot be that the products of corruption can be constantly admitted into the human body without danger of insidious mischief, and there is the still greater danger of the impurities of the soil passing unchanged into the water, and being a source of quick and certain injury. The water from the city wells is constantly changing—in fact it is hardly the same from hour to hour; for the soil through which it passes is pierced in every direction with drains and sewers, and is charged with every species of corrupting refuse, which passes in variable proportions into the porous strata from which the water is pumped. This ought to tell us not merely of the disgusting nature of the supply, but also of the dangers which lurk within it. Experience has shown that wells like these are liable at any moment to receive the leakings from a cesspool or a sewer, and thus to be the immediate cause of fatal disease. In the autumn of 1854 there was a sudden and serious outbreak of cholera in the parish of St. James's, Westminster. The course of the disease was confined to a small area in the neighbourhood of a favourite pump in Broad-street; and soon it was remarked that of 73 persons who died during the first days of the visitation, 61 had been drinking the water of the pump. It was also remarked that among persons who were living in the same street, and occasionally in the same houses, those

only were attacked who drank the water of the favourite pump; in fact, in a number of cases which were particularly investigated, it was ascertained that persons who lived at a distance from the parish, and who had the water sent to them because of its supposed goodness, were seized with cholera and died. A full inquiry into the circumstances of the matter proved that the well had become charged with cesspool drainage, and had thus acquired its poisonous action. Again, in the cholera visitations of 1848–9 and 1853–4 there were two striking examples of the influence of such water in the propagation of disease. The Southern districts of London, comprising nearly a fifth of the population of the metropolis, were visited most severely with cholera at both of those outbreaks, and the persons who suffered most on each occasion were those who drank the worst quality of water. The inhabitants of those districts are supplied by two rival companies, who obtained their water from the Thames at different parts of its course. In one case the water was charged with a larger amount of organic matter than in the other; and, although the conditions of the population were in every other respect the same, yet this had the effect of augmenting the mortality to a frightful extent. In the second visitation of the disease the circumstances of the supply were changed, the water of the old company, which was once the worst, was then the best, and the severity of the disease was changed likewise; for those who partook of the still bad supply suffered as before, and their mortality was three and a half times greater than their neighbours. The town of Newcastle-upon-Tyne was supplied with comparatively pure water in the year 1849, and then it suffered but little from cholera, whereas, in the visitation of 1853, when there was so calamitous a loss of life from this disease, the water supply was made impure by the drainage from the sewers. The same effect was the result of the same cause in Hull, in 1849, and other examples may be cited, in which the converse happened, as at Exeter, where the inhabitants, after having suffered severely from cholera in 1852, obtained pure water, and escaped its ravages. Nor are the percolations from the graveyards of a city less injurious; experience has demonstrated that this also is a prolific source of disease. Sir James Macgregor relates that when the British army was in Spain, about 20,000 soldiers were buried in a rather small space of ground; this was done in the course of two or three months, and soon the troops who drank the water from the wells of the neighbourhood were attacked with dysentery and malignant fevers. The cause of the mischief was clearly traced to the hardly recognizable impurity in the water from the shallow wells. Here, however, in the churchyards of this city, there are the remains of ten times such a buried army undergoing decay; and in the whole of this metropolis, in a space of not more than 218 acres of soil, there were buried not long since as many as 50,000 dead in the year. In a generation of thirty years this would give us 1,500,000 of decomposing bodies in the surface soil of London, and through these the water percolates to find its way into the porous stratum which supplies the shallow wells. At best, the change of this corruption is but imperfect, and the presence of ammonia and saltpetre tells of the process of decay, and indicates the dangers which accompany it.

"All these considerations have forced upon Dr. Letheby the conclusion that water from rivers and surface wells, contaminated with the refuse of drains and the soakings from graveyards, is unfit for public use.

UTILIZATION OF SEWAGE.

The following letter has been addressed to the Editor of the *Times*:—

"Sir,—I rejoice to be able to tell you that considerable progress is being made in the application of town sewage to the production of food.

"At the Earl of Essex's estate, Cashiobury, I yesterday saw a stream of sewage from Watford applied with much profit to the soil, as proved by the enormous crops of roots, rye-grass, and other productions.

"The sewage of Wimbledon now flows over 20 acres of land in Wimbledon-park, and that portion on which it was applied in the spring has produced luxuriant and remunerative crops. The cost of preparing the land for its reception by gravitation is only between £3 and £4 per acre. At the Colney Hatch Lunatic Asylum the sewage is being availed of, and I am happy to say that the governing powers of various lunatic asylums, pauper unions, prisons, and charitable institutions, are considering this important question.

"The sewage of some 25,000 people at Croydon is flowing by gravitation over 300 acres, a spirited and close calculator from Essex having rented the land at a high rental for a long term. Altogether, it is refreshing to think that we shall soon see our exhausted fields replenished with fertility by the sewage of our towns.

"The great sewers of the main drainage are sufficiently high above-ground to permit a most extensive irrigation from them by gravitation, at a very small cost for preparing the land.

"I am, Sir, your obedient servant,

"J. J. MECHI.

"4, Leadenhall-street, Oct. 22."

EXTRACTS FROM THE REPORTS OF H.B.M. CONSULS.

(*Continued from page* 782.)

Sugar of the Phillippine Islands.—The unclayed sugars of the Phillippines in ordinary times, even with the present defective, and consequently expensive mode of manufacture, are held to be the cheapest in the world. At present, the only Europeans engaged in the cultivation of sugar in this quarter, are a Spanish and a French planter at Isla de Negros (the latter of whom produces an excellent sugar, which always commands upwards of a dollar per picul more than ordinary Iloilo), and a French planter in this province, who has lately commenced on a limited scale.

Sapanwood.—Sapanwood is exported in considerable quantity from the province of Iloilo. It is chiefly produced in the vicinity of the southern coasting towns, Giumbal, Nuagao, and San Joaquin (the farthest within 20 miles of Iloilo), from whence the greater part is brought round by sea to Iloilo for exportation to Manila, and the rest shipped west from Giumbal. The large quantity of this dyewood shipped (mostly to Europe and the United States) from Manila is generally taken at a comparatively low freight in lieu of dunnage; but a considerable portion, both of straightwood and roots (the latter of which are used in China and at Calcutta), is sent on yearly to Singapore and Amoy, and forms the bulk of cargoes of such vessels as load at Manila for the former port. One of the shipowners of Iloilo has it in contemplation to place a vessel of 300 tons, now about to be constructed here, in the Singapore trade, *i.e.*, to leave this for Singapore direct with sapanwood and other articles, and return with a freight of piece goods and other effects for the Manila and Iloilo markets. The quality of the Iloilo sapanwood would be much better were the natives to abstain from the practice of cutting down a large proportion before the trees are sufficiently grown. When allowed to obtain its proper development, it is said to be equal or superior to that of Misamis and Bolinar, at present the best qualities brought to the Manila market. As both settlers and brokers endeavour to deliver the wood as soon as practicable after it is cut, the loss in weight on the voyage to Manila is said to be sometimes as much as 12 to 14 per cent. The present price of sapanwood delivered at Iloilo is, with the addition of 25 per cent. for cost of silver, 1 dollar 8 cents per picul against the Manila rate of 1 dollar 75 cents to 1 dollar 87½ cents, leaving a considerable

margin in favour of vessels loading here for a foreign market. The freight to Manila is 31¼ cents per picul.

Gutta Percha.—Some quantity of this valuable substance has been sent from hence (Iloilo Phillippine Islands) to Manila; but, either owing to adulteration, or ignorance of the proper mode of boiling, it has not obtained an encouraging price. I have sent samples of the best I have been able to procure to Singapore, for analysis and report, and am expecting a memorandum of the proper mode of boiling. The tree called by the Bisayas "nato," yielding it, abounds in this province and at Guimaras, and if it prove to be the real Isonandra Gutta of the Straits and Borneo, should hereafter become of considerable importance. The monopoly of shipment from Manila has an injurious effect on the production of this article.

Roads.—The Port of San Nicolo, in the eastern part of the Island (Crete), and the centre of a very fruitful district, is to be made a loading port, which will be a great advantage to the agricultural population of that district. A good carriage road has been made from Canea to the Bay of Suda; similar roads are to be made in various parts of the Island. An English civil engineer has been for some time past engaged in making the necessary surveys. The population has offered to work nine days per annum towards the construction of the roads. It was in this manner that they were made in the Ionian Islands. Carts have been introduced from Malta, and it is hoped that the inhabitants will gradually get into the habit of using them when practicable.

English Mining Establishment on Mount Pelion (Volo), Turkey.—The geological formations of the Pelion range generally consist of primitive clay, slate, and limestone, the former being the basis of the grand formations of the country, and in them the mineral veins lie very numerous, running from east to west (magnetically). The first firman that was issued for the working of the lead and silver mines, discovered by an Ionian (Mr. A. Cazotti), in the district of Volo, in the year 1848, was granted by the Sultan to Izett Pasha, the present minister of police, for a term of eleven years. Izett Pasha, after working a few of the mines on his own account for three years, gave up the enterprise, which, on account of gross mismanagement and peculation on the part of the persons employed by him, Turks, Armenians, and Greeks, proved unsuccessful; and, in 1854, he assigned his rights to Messrs. Edmund Leahy and Charles Grace. A second firman was recently obtained, extending the privileges of the first, for a term of thirty-one years—from 1856 to 1887. The Sandjacks (provinces) of Tricalla and Joannina, as mentioned in the Sultan's concessions, or firmans, embrace the entire of Thessaly, a greater portion of Lower Albania, and a section of Macedonia—the whole covering a superficial area of about 20,000 miles, many sections of which are well known to be rich in mineral deposits of gold, silver, lead, copper, iron, antimony, arsenic, and coals. Messrs. Leahy have the exclusive privilege of working all, on the annual payment of 70,000 piasters into the Sultan's privy purse, equal to £600, in lieu of all royalty, customs dues, and other taxes. The district possesses many advantages for the export of minerals, having a great extent of sea-board both in the Adriatic Sea and in the Ægean Sea, or Grecian Archipelago. The boundary in the Adriatic Sea comprises 200 miles in length, northwards, extending along the sea coast from the Gulf of Arta, past the Island of Corfu, to within a short distance to the town and harbour of Durazzo in Albania. The boundary in the Grecian Archipelago, or Ægean Sea, embraces about 150 miles of sea coast, from the Gulf of Volo to Catterina in the Gulf of Salonica. The present proprietors of the firmans commenced and completed extensive works along this latter coast, on the eastern slopes of Mount Pelion, and about three-quarters of a mile from the sea. They have expended from £40,000 to £45,000 on those works, which are now actively and profitably occupied in dressing and smelting the rich ores of Galena, numerous veins of which have been discovered in Mount Pelion, and from which considerable quantities of lead, silver, and gold, are extracted. The buildings where the ore is smelted are called "Pelion Works." They include the following mechanisms and compartments:—A wheel, on a new principle, driven by the pressure of a column of water introduced at the upper extremity of a tube, with a fall of sixty-four feet. The water is conveyed through an artificial course, and never fails at any season of the year. The wheel, at present worked to only fifty horse-power, drives the fan-blast; and the surplus water runs down a trombe, which likewise supplies air for the furnace blasts. The furnaces are thus well supplied with air; and the gases evolved in the different processes of smelting and refining the metals are condensed in a long flue terminated by a high chimney, which renders the establishment healthy, and entirely prevents the ordinary illness to which such works are subjected. The wheel likewise drives several stampers where the inferior description of ore is pounded up in water, and is, by repeated operations, reduced to the condition of the finest sand, from which the muddy particles are removed by washing in pans or trays. There is a circular saw which is set in motion at pleasure, and it is most useful in cutting up timber into planks. There are various description of furnaces: three, resembling ovens, are used for roasting the ore preparatory to its being smelted at the ore hearths, of which there are six. Here the ore is treated with charcoal and lime, and the liquid metal is collected in the bottom and overflows into a pot placed in front; a portion of ore concretes and becomes slag, which undergoes a different treatment in the cupola furnace. At the ore hearths, the mixed metal is run into moulds and carried to the separation-house, where there are eight iron pots with heating grates underneath. Here the mixed metal undergoes the crystallizing process, invented or improved by Patterson, which has the effect of purifying the lead, and of the residue forming a separate amalgam, containing a very large proportion of silver. This amalgam is then transferred to the cupellating furnaces, where the lead is blown off in the form of litharge, and a cake of pure silver containing gold is formed. There are also large stores for charcoal, which is easily and plentifully supplied at less than half the cost of coal. Within a few hours of the works, there are extensive forest lands which supply large quantities of fuel, at a cost of 1s. 6d. the load of firewood, equal to 300 lbs. weight; and 4s. for the charcoal load. The foremen smelters, refiners, and miners, are all English—besides a few Germans, Swiss, Poles, and Ionians. They are well paid: some at £15 and others at £12 per month. In the smelting, refining, and other departments of the Pelion Works, a considerable number of native Greeks are employed. Lads of twelve to fifteen years of age are generally selected. They conduct themselves well, are very intelligent, and hard-working. Their pay varies according to age and service, from 6d. to 1s. per diem. Those employed in the working of the mines, under the superintendence of Englishmen and foreigners, are all natives. They are paid from 6d. to 3s. per day. Native workmen are plentiful, and labour comparatively cheap to what it is in other countries. Living and house-rent are also cheap. The company have from 350 to 400 men and boys in their employ—more than 200 of whom hold permanent situations. They are all generally well conducted. Now and then, disorders, arising out of drunkenness, take place; but the guilty parties are either dismissed or fined, or else submitted to a decrease of pay. On the whole, the establishment is kept in perfect order and under a judicious but not too severe system of discipline. The mines are all properly worked, ventilated, and drained; and the galleries solidly constructed—accidents therefore rarely happen. The climate is good, and the locality in which the works are situated very healthy. Of all the foreigners that are employed, only one Englishman died, his death being caused from excess of drinking. Some of the ores of Galena, in the mountain, are very rich—yielding, I am told, as much as 82 per cent. The

minerals are not, however, equally rich. The veins vary in breadth from ten to two feet, and, on an average, yield about 32 per cent. of mixed metals, consisting of gold, silver, and lead. The gold and silver is refined in the establishment to such a high degree, that not more than two parts in a thousand of any foreign matter can be detected, and the lead is admitted to be of the very best quality. There are at present considerable quantities of lead in pigs, and several large ingots of silver and gold ready for shipment. Hitherto the silver and gold had been sold to the Turkish Mint, but it is the intention of the proprietors to send to England, as a trial, what is now ready. The Pelion Works, when in full operation, are capable of yielding from nine to ten tons per day of mixed metal, combining gold, silver, and lead; and of separating the gold and silver from the lead. The mixed metal is worth, on an average, about £50 per ton; and taking ten tons per day, the value of the metals which can be produced from only a small angle of Mount Pelion will be £500 daily. Communication between the different mines and the Pelion Works, some of which are situated about six hours from them, is difficult. The ore is carried on mule-back over the mountains by winding footpaths through valleys and forests. In autumn, the mountain torrents, swollen by the rains, often put a stop to communication for two or three days; and in winter there is a similar hindrance from heavy falls of snow. From the works to Khorefto, the roadstead of Zaghorà, the principal village on the eastern slopes of Mount Pelion, the distance is about three-quarters of a mile. The lead and silver is carried down on mules, and there shipped on board of Greek vessels for Salonica, from whence it is re-shipped to Constantinople, &c. The roadstead is difficult and dangerous for shipping, especially during winter. It is also exposed, and the Pelion Works too, to an attack from pirates, in consequence of its proximity to some of the Greek Islands. The establishment is also open to attacks from brigands; but, in concert with Mr. Consul Calvert, I obtained a force of police from the authorities for the immediate protection of the proprietors, their workmen, and property. The force is composed of twenty-five men, twelve of whom are Greeks and thirteen Albanians, under the immediate orders of the proprietors. They are all picked and trustworthy men; and, besides the pay and rations they receive from the authorities, the proprietors make them an equal allowance; in this manner they get double pay. They have been found hitherto very obedient, faithful, and well-behaved; and they, besides, make themselves generally useful. At the request of the proprietors, both Mr. Calvert and myself thought fit to demand an increase to this police force; and I am happy to say that the authorities, although they put forward difficulties at the beginning, are now disposed to raise the force to fifty effective men. The establishment being yet in its infancy, it would be difficult to specify the extent of the profits that are realised; nor am I able to ascertain, with any accuracy, the relative amount or value of the metals that have been extracted and shipped. But, basing my calculations on the scale on which operations are now conducted —and they are comparatively limited—as well as on the information I have obtained from the proprietors, I should say, approximately, that twenty tons of mixed metal are run every week. The ton of lead yields from 60 to 160 ounces of silver and gold amalgam, the value of the gold being estimated as equal to that of the silver with which it is combined.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, October 18th, 1861.*]

Dated 8th June, 1861.

1457. H. Du Mont, 150, Rue de Rivoli, France—A photographic apparatus, having for object to reproduce the successive phases and shiftings of a motion.

Dated 11th July, 1861.

1747. P. Adie, Strand—Imp. in apparatus in connection with railway carriage buffers, for preventing damage in cases of railway collision.

Dated 1st August, 1861.

1917. G. Edwards, 4, Park-road villas, Battersea—Imp. in means and apparatus for propelling by traction carriages and other vehicles on railways, tramways, and other roads.

Dated 3rd August, 1861.

1927. G. F. Jones and J. Jones, York—Imp. in apparatus for protecting and arranging water pipes, and withdrawing water therefrom, and preventing injury thereto by frost.

1935. W. E. Newton, 66, Chancery-lane—An improved process for producing colouring matters or pigments from manganese. (A com.)

Dated 5th August, 1861.

1941. E. D. Johnson, Wilmington-square—An imp. in the construction of centre seconds watches.

Dated 17th August, 1861.

2051. P. Hart, Hampton-wick—An imp. in mills for grinding.

Dated 20th August, 1861.

2069. S. Whittaker, Haverstock-hill, and R. A. Jones, Aylesbury—Imp. in operating upon railway signals, and in indicating their position by means of electricity.

Dated 26th August, 1861.

2122. H. Nelson, Manchester, J. Carr, Blackburn, and G. Harrison, Burnley, Lancashire—Imp. in self-acting mules for spinning cotton and other fibrous materials.

Dated 28th August, 1861.

2146. J. Duncan, Greenock—Imp. in the manufacture of sugar, and in the apparatus employed therein, also in the apparatus employed in reburning animal charcoal.

Dated 30th August, 1861.

2155. L. D. Owen, 481, New Oxford-street—Imp. in ploughs. (A com.)

Dated 31st August, 1861.

2169. W. Hensman, Woburn, Bedfordshire, and W. Hensman, jun., Linsdale, Buckinghamshire—Imp. in apparatus for tilling land by steam power.

2176. E. J. Hughes, 123, Chancery-lane—An improved apparatus for collecting the gases which escape from furnaces. (A com).

2178. W. A. Gilbee, 4, South-street, Finsbury—Imp. in the process and apparatus for the manufacture of steel. (A com).

2180. W. Fox, Amiens, France—Imp. in parasols and umbrellas. (A com.)

2182. F. Curtis, Bilston—Imp. in forming or shaping the top or upper parts of boots from woollen and mixed fabrics.

Dated 4th September, 1861.

2198. A. White, Great Missenden, Buckinghamshire—An improved apparatus for stopping railway trains.

Dated 6th September, 1861.

2231. J. Brown, Burnley—Certain imp. in power looms for weaving.

2233. E. Harrison, and T. S. Yates, Oldham—A certain compound or certain compounds to be used as a substitute for gunpowder.

2234. M. Henry, 84, Fleet street—Imp. in apparatus for signalling on railways by means of electricity. (A com.)

Dated 7th September, 1861.

2236. E. Taylor, Blackburn—Imp. in obtaining motive power by the combination and arrangement of levers and weights.

2237. W. Ainsworth, E. Heap, W. Fielding, and E. Openshaw, Adlington—Certain imp. in power looms for weaving.

2238. N. D. P. Maillard, Dublin—Imp. in the material and preparation of the material and apparatus for making potash, pearlash, and caustic potash of commerce.

2241. J. Holland, Manchester, and G. Okell, Ashton-under-Lyne—Imp. in apparatus by which an engine or train is made to give an alarm or signal at any required place on arriving at or passing any given point on the railway.

2242. H. Redgrave, Nottingham—Imp. in machinery for the manufacture of skirts usually called crinoline skirts.

Dated 9th September, 1861.

2246. W. Simons, Renfrew—Imp. in constructing ships or vessels.

Dated 10th September, 1861.

2256. T. S. Tyson, Leeds—The application of a self-acting lubricator to corves and waggons.

Dated 12th September, 1861.

2262. G. H. Birkbeck, 31, Southampton-buildings, Chancery-lane—Imp. in needles. (A com.)

2263. J. A. Dauncey, Manchester—Imp. in the manufacture of collars and wristbands.

Dated 13th September, 1861.

2272. W. Davis, Snow-hill, Birmingham—An improved apparatus for the prevention of accidents to vehicles drawn by affrighted horses.

Dated 14th September, 1861.

2292. F. Barnett, 60, St. Mary-axe—Improved automatic electric signals to prevent collisions on railroads and railways.

Dated 17th September, 1861.

2316. F. Barnett, 60, St. Mary-axe—An imp. in the light given by street and other lamps, by means of reflectors in white

earthenware, china, and all enamel materials in conjunction with an improved chimney to draw up the exhalations and smoke of all lighting materials.

2317. J. Eastwood, and J. B. Joyce, Bradford—Imp. in machinery or apparatus for combing wool and other fibrous substances.

2318. F. J. E. A. G. d'Olincourt, 113, Rue de Flandre, Paris—A new system of cultivating land, and for preventing the disastrous effects of inundations.

Dated 19th September, 1861.

2337. C. W. Eddy, 5, Chester-terrace, Regent's-park—A new method of arming the bow of a ship of war with a shell and a beak to be fitted and unfitted at pleasure, and to be used conjointly or separately.

2344. J. Graham, 2, Anne-street, Devonshire-street, Commercial-road East—An improved double acting force or lift pump, for ships' fire-engines, and other purposes.

Dated 20th September, 1861.

2352. H. Walter and D. Johnstone, Manchester—Imp. in castors.

2354. C. Perman, Salisbury—Imp. in machinery or apparatus for cutting and turning up the soil of land for cultivation.

2355. J. Burnand, 31, Netherthorpe-street, Sheffield—Imp. in the means of fastening or securing the handles of table knives and forks, daggers, and other similar articles.

Dated 23rd September, 1861.

2377. L. Jacob, Golden-square—Imp. in the mode of and apparatus for obtaining and treating hydrogen gas, and the application thereof to various purposes, parts of which imps. are applicable to the manufacture of iron and steel. (A com.)

Dated 25th September, 1861.

2388. C. G. Lenk, 24, Maddox-street, Regent-street—Improved pens.

Dated 26th September, 1861.

2399. D. J. Fleetwood, George-street, St. Paul's, Birmingham—An imp. or imps. in nails.

2401. H. Nunn, Chelsea—Imp. in mangles.

2403. G. Caldwell, Kilmarnock, and J. Y. Miller, Renfrew—Imp. in apparatus for dressing flour.

2405. S. S. Robson, Sunderland—Imp. in machinery or apparatus for raising or lowering heavy bodies.

2409. J. D. D. Passager, Paris—Imp. in lamps for burning palm or other similar fat oil.

2411. R. Davis, Splidts-terrace, Back Church-lane—Imp. in churns.

Dated 27th September, 1861.

2413. R. Franklin and G. Bacchus, 10, Chapel-street, Stratford—A reversable back-supporting nursing belt.

2417. D. McCallum, Greenock—Improved arrangements for filling and closing bottles and other vessels.

2418. S. Rowsell, Buckland St. Mary, Somersetshire—Imp. in horse rakes.

2421. G. J. Ganier and E. E. Collet, 12, Place de la Bourse, Paris—Imp. in envelopes.

Dated 28th September, 1861.

2423. W. N. Wilson, 144, High Holborn—Imp. in sewing machines and apparatus connected therewith.

2425. J. Reeves, New York—Imp. in electro-magnetic machines for obtaining and applying motive power.

2429. M. Theiler, Einsedeln, Switzerland—Imp. in telegraphs.

Dated 30th September, 1861.

2432. E. Funnell, 54, East-street, Brighton—A self-acting alarum which can be fixed on tenders, guards' compartments, or other parts of railway trains for preventing collisions.

2433. J. S. Bickford and G. Smith, Camborne, Cornwall—Imp. in the manufacture of safety fuzes.

2435. J. Lush, St. George's-square, Portsea—Imp. in mashing at-temperators.

2436. C. H. Pennycook, Glasgow—Imp. in chimney hoods and ventilators.

2437. W. J Christy, St. Albans—An improved method of mailing ships of war.

2441. P. A. F. Bobœuf, Paris—The preparation and application of certain new hemostatic and antiseptic agents.

Dated 1st October, 1861.

2443. J. A. Knight, 4, Symonds-inn, Chancery-lane—Imp. in the manufacture of boots and shoes. (A com.)

2445. R. Nightingale, Malden, Essex—Imp. in markers butts or mantelets.

2447. J. W. Scott, Worcester—Imp. in tools for the manufacture of leather and other rings, washers, and laces.

2449. W. S. Hogg, Rotherhithe-wall, Rotherhithe—Imp. in rendering columns, girders, doors, shutters, and other parts of buildings fire-proof.

Dated 2nd October, 1861.

2453. A. Wyley, Allsop's place, Regent's-park—Imp. in fire-arms.

2461. E. Breffit, King William-street—Imp. in the manufacture of boxes or cases, and in machinery employed therein.

Dated 3rd October, 1861.

2463. J. C. Dickinson, Blackburn—Certain imp. in steam engines.

2464. W. T. Henley, St. John's-street-road, Clerkenwell—Imp. in magnetic and electric telegraph apparatus, which are also applicable to other purposes.

2465. J. C. Haddan, Bessborough-gardens, Pimlico, and C. Minasi, 3, Saint James's-terrace, Kentish-town-road—Imp. in the mode of discharging cannon, and in apparatus for facilitating the proper aiming with fire-arms.

2467. H. Law, 15, Essex-street, Strand—Imp. in machinery and apparatus for raising ships and other vessels out of the water for the purposes of examination, cleaning, or repair, some of which are applicable to the docking of vessels for the same purposes.

2470. T. Evans, Westmoreland-street, Westminster—Imp. in the manufacture of boots, shoes, and other coverings for the feet, and in the machinery, apparatus, and means connected with such manufacture.

2471. C. Mauvernay, Lyons—An improved method of signalling the passage of trains upon railways.

2472. J. Wood, Birmingham—Imp. in the manufacture of metal pens, and holders in tools employed therein, and in cards for carrying the same.

Dated 4th October, 1861.

2475. P. Knowles, Bolton-le-Moors, Lancashire—Imp. in machinery for opening and cleaning cotton and other fibrous materials.

2476. E. T. Hughes, 123, Chancery-lane—Imp. in the permanent way of railways. (A com.)

2477. C. Husson, Nantes—An improved process for silvering looking glass in piles of several sheets superposed without interruption, which process consists in the use of a chemical powder.

2479. J. Beesley, Coventry—Imp. in covering crinoline wire and other like substances.

2481. C. M. Elstob, Spalding, Lincolnshire—Imp. in buckets and portable water-cisterns.

2483. J. Pratt, Coventry—Imp. in shuttles for weaving ribbons.

2485. S. Icely, Kent-cottage, Byron-street, Bromley—An improved manufacture of gongs.

2486. J. Tweedale, Milkstone, Rochdale—Imp. in machinery for preparing and spinning cotton and other fibrous substances.

Dated 5th October, 1861.

2490. W. Rowan, Belfast—Imp. in cylinders or drums and beaters for machines for scutching and preparing flax and other fibres.

2491. P. O'Connor, Havertree, near Liverpool—Imp. in the construction of gas stoves for heating and warming.

2493. J. Turner, Upper Thames-street—An improved machine for mixing, mincing, and pounding.

2497. W. Squire, Upper Montagu-street, Bryanstone-square—Improved machinery for planing and shaping wood.

Dated 7th October, 1861.

2499. A. Chaplin, Glasgow—Improved combined winding engine boiler and cooking and distilling apparatus, including imps. also applicable separately.

2503. J. E. J. Sansum, Lower Kennington-lane—Improved machinery for mashing malt.

Dated 8th October, 1861.

2507. W. Catford, Chard, Somersetshire, and J. S. Wheatley, Nottingham—Imp. in the manufacture of bobbin net or twist lace.

2509. G. Glover, Lowestoft—Imp. in constructing fire-proof doors and window shutters.

2513. J. E. Grisdale, 53, Cheapside—Imp. in certain tickets or passes for railway and other purposes.

PATENTS SEALED.

[*From Gazette, October 18th*, 1861.]

October 16th.

953. B. Brown and R. Hacking.
955. R. A. Brooman.
962. P. Mingaud.
966. J. Ridley.
968. J. Ridley.
973. W. Hudson and C. Catlow.
979. J. Pinchbeck.
980. R. A. Brooman.
984. S. B. Haskard, J. Dean, and E. Dean.
994. A. Dugdale.
999. C. Carey.
1000. A. Henry.
1002. T. Y. Hall.
1006. P. Ward.
1016. E. Woodcock.
1017. F. J. Bramwell.
1020. G. D. Davis and J. Davis.
1022. J. Rhodes and R. Kemp.
1025. W. Wilson.
1035. W. Harris.
1039. S. Fox.
1051. F. C. Warlich.
1055. J. Dellagana.
1057. E. H. Joynson.
1065. G. G. Ray.
1067. G. M. Story and G. W. Edwards.
1071. J. Mash.
1077. H. J. T. Labat.
1079. J. Meyer.
1082. I. Hollis.
1097. W. Hoyle.
1101. W. Clark.
1117. W. E. Newton.
1132. G. Ager.
1146. S. Stevens.
1167. W. W. Harrison.
1250. A. V. Newton.
1566. M. McKay.
1681. H. H. Bishop.
1731. R. Hornsby, jun.
1742. R. Hornsby, jun.
1945. M. A. F. Mennons.
2059. W. Gossage.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, October 18th*, 1861.]

October 14th.

2316. A. Dunn.
2332. A. Allan, T. Whimster, and R. Gray.

[*From Gazette, October 22nd*, 1861.]

October 19th.

2351. J. M. Napier.
2401. G. M. Cantini and J. O. Barnard.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, October 18th*, 1861.]

October 14th.

2221. A. Illingworth and H. Illingworth.